

REMARKS

Interview Summary

Applicants thank the examiner for his time in discussing the application. Claim 1 was discussed, and it was concluded that more clear language would help the examiner understand the differences between the matter recited in claim 1 and that in U.S. Patent No. 6,212,544 ("Borkenhagen").

Claim Objections

The examiner objected to claims 1, 15, and 22 because of an alleged lack of clarity in the phrase "a plurality of microengines, a microengine including a context event arbiter." Applicants have amended claims 1, 15, and 22 to overcome the objection

The examiner objected to claims 4-8, 10, 11, 13, and 18-21 because of an alleged lack of clarity in the phrase "wakes up the swapped, current context." Applicants have amended claims 4-8, 10, 11, 13, and 18-20 to recite "wakes up the swapped out context." Accordingly, the objection should be withdrawn.

Claim Rejections – 35 U.S.C. § 103

The examiner rejected claims 1-8, 10-16, 18-22, 24, and 26 under 35 U.S.C. § 103(a) as being unpatentable over Borkenhagen in view of Official Notice.

Claim 1 recites "directing the processor ... to swap, based on a user-specified parameter specifying an occurrence of an event communicated to a context event arbiter in one of the microengines, a currently running context corresponding to a first thread, with the user-specified parameter being associated with a shared resource, the user-specified parameter being specified in a context-swap instruction ..."

The examiner contends:

Borkenhagen teaches...directing the processor having to swap based on a user-specified parameter specified in a context-swap instruction, a currently running context, corresponding to a first thread, in a specified

microengine to let another context, corresponding to a different thread that is ready to execute, execute in that microengine and cause a different context and associated program counter to be selected (Column 14, Lines 16-20, 29-33, and 41-44. Software (user) instructions can be executed to enable or disable specific events to cause a context switch, which causes a new context, which inherently has its own program counter, to be executed in place of the original)...¹

[Borkenhagen] fails to teach...a plurality of microengines, a microengine including a context event arbiter...[but] Borkenhagen discloses a means to further increase the performance of each of these individual processors, however, one of ordinary skill in the art would have been motivated to implement several of the processors described by Borkenhagen into a single, multi-core processor, as suggested by Borkenhagen himself, in order to further increase the system performance. In this case, the parallel processor corresponds to the multicore processor, and each microengine corresponds to the individual processor cores described by Borkenhagen, each with their own context arbiter to change contexts.²

Applicants disagree. Borkenhagen describes:

[an] excessive delay that may exceed the maximum acceptable time is the latency of an inactive thread waiting to service an external interrupt within a limited period of time or some other event external to the processor. Thus, it becomes preferable to force a thread switch to the dormant thread after some time if no useful processing is being accomplished to prevent the system from hanging.³

FIG. 4 of Borkenhagen is reproduced below:

¹ Office Action, Mail Date November 3, 2009, Pages 3-4

² Id., Pages 4-5

³ Borkenhagen, Column 15, Lines 42-48

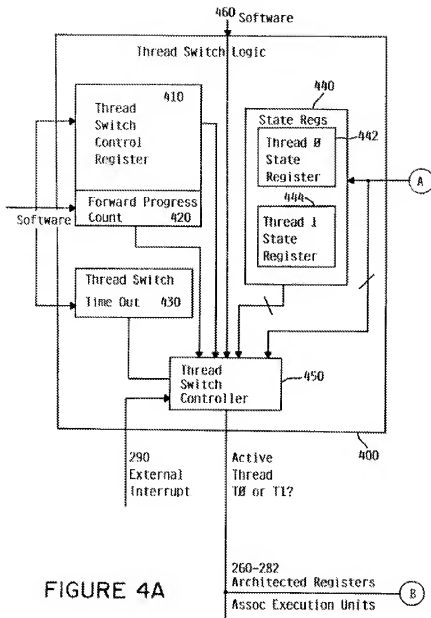


FIGURE 4A

The Thread Switch Logic 400 of Borkenhagen, which the examiner equates with the context event arbiter of claim 1, waits to receive a signal from an external interrupt 290 as shown in FIG. 4. The latency of an inactive thread waiting for such a signal is limited by forcing a swap to the dormant thread after some maximum acceptable time in order to prevent a system hang. As to the mechanism that determines such a time, Borkenhagen describes: "The thread switch time-out register 430 can be written by a service processor as described above or by the processor itself with

software code. The thread switch time-out value loaded into the thread switch time-out register 430 can be customized according to specific hardware configuration and/or specific software code to minimize wasted cycles resulting from unnecessary thread switching.⁴”

Borkenhagen, however, fails to describe or render obvious “directing the processor to swap, based on a user-specified parameter...a currently running context...with...the user-specified parameter being associated with a shared resource...the user-specified parameter being specified in a context-swap instruction,” as recited in claim 1. Rather, associations with external resources via the external interrupt 290 in Borkenhagen are written to the Thread Switch Time Out Register 430 by a service processor or by the processor with software code, and are not specified in a context-swap instruction.

Examiner's Official Notice that a set of registers makes a stack fails to remedy the deficiencies of Borkenhagen. Borkenhagen and Official notice, alone or in combination, neither describe nor suggest “directing the processor to swap, based on a user-specified parameter...a currently running context...with...the user-specified parameter being associated with a shared resource...the user-specified parameter being specified in a context-swap instruction,” as recited in claim 1.

Claims 15, 22, and 24 recites similar features as in claim 1. Accordingly, the rejection should be withdrawn.

It is believed that all the rejections and/or objections raised by the examiner have been addressed.

In view of the foregoing, applicant respectfully submits that the application is in condition for allowance and such action is respectfully requested at the examiner's earliest convenience.

All of the dependent claims are patentable for at least the reasons for which the claims on which they depend are patentable.

Canceled claims, if any, have been canceled without prejudice or disclaimer.

Any circumstance in which the applicant has (a) addressed certain comments of the examiner does not mean that the applicant concedes other comments of the examiner, (b) made

⁴ Borkenhagen, Column 16, lines 20-26

arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims, or (c) amended or canceled a claim does not mean that the applicant concedes any of the examiner's positions with respect to that claim or other claims.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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